CALIFORNIA ENERGY COMMISSION
1516 Ninth Street, MS-29
Sacramento, California 95814

Web Site: www.energy.ca.gov

January 24, 2000

Members of the Senate Energy, Utilities and Communications Committee
Members of the Senate Budget and Fiscal Review Committee
Members of the Senate Appropriations Committee
Members of the Assembly Utilities and Commerce Committee
Members of the Assembly Budget Committee
Members of the Assembly Appropriations Committee
California State Capitol Building
Sacramento, California 95814

Re: California Energy Commission s Quarterly Report Concerning the Public Interest Energy Research Program

Dear Members:

In accordance with Public Resources Code Section 25620.5(h), the California Energy Commission hereby transmits its Quarterly Report regarding the Public Interest Energy Research (PIER) Program for the period October 1 through December 31, 1999. The enclosed report provides the required evaluation of the progress and a status of the PIER Program s implementation for this quarter.

To date, the Energy Commission has made substantial progress in meeting the goals of the PIER Program, as demonstrated by the early results of PIER-funded projects that will help improve the quality of life for California citizens (see enclosed report for descriptions of project results). Should you have questions or comments concerning this report, please feel free to contact Tim Schmelzer, Director of Governmental Affairs, at 654-4942.

Respectfully submitted,

_____
DAVID A. ROHY, Ph.D.
Vice Chair and Presiding Member
Research, Development and
Demonstration Committee

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ROBERT A. LAURIE
Commissioner and Associate Member
Research, Development and
Demonstration Committee

Enclosure

cc: Legislative Analyst s Office

California Energy Commission s Quarterly Report Concerning the Public Interest Energy Research Program (October 1 through December 31, 1999)

California Energy Commission
Attn: Governmental Affairs Office
1516 9th Street, MS-30
Sacramento, California 95814
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California Energy Commission s Quarterly Report Concerning the Public Interest Energy Research Program (October 1 through December 31, 1999)

In accordance with Public Resources Code (PRC) Section 25620.5(h), this document hereby constitutes the California Energy Commission s Quarterly Report for the Public Interest Energy Research (PIER) Program, covering the period from October 1 through December 30, 1999. This report provides the required evaluation of the progress and a status of the PIER Program s implementation for this past quarter. It also provides input for the Energy Commission s more detailed Annual Report Concerning the Public Interest Energy Research Program (hereafter referred to as PIER Annual Report) required pursuant to PRC Section 25620.8. The 1999 PIER Annual Report will be submitted during the first quarter of 2000.

I. SUMMARY STATUS OF THE PIER PROGRAM

As specified in PRC Section 25620, the primary mission of the PIER Program is to improve the quality of life of this State s citizens . . . [by funding] public interest energy research, development and demonstration [RD&D] projects that are not adequately provided for by competitive and regulated energy markets. The funds for this program, totaling approximately $61.8 million annually, come from the electricity ratepayers of specified investor-owned utilities and are held in the PIER Program Trust Fund Account.

During the fourth quarter of 1999, the Energy Commission managed contracts for 83 PIER projects and two specific RD&D collaborative funding efforts that received approximately $69 million in PIER funding awards from the Energy Commission during 1998 and 1999. Of the 39 PIER-funded Transition projects initiated in 1998, 37 were completed as of the fourth quarter of 1999. In addition, the Energy Commission approved three separate contracts awarded pursuant to a competitive programmatic solicitation in the Building End Use Efficiency program area, and two other contracts awarded through sole sources in the Strategic Energy Research program area.

Also, on October 25-27, 1999, the Energy Commission sponsored the first major PIER Technology Symposium in San Diego, California. Approximately 300 people from throughout the State and the nation were in attendance.

Further details concerning the Energy Commission s PIER Program activities for the fourth quarter are provided below.

II. PROJECT RESULTS FROM COMPETITIVE SOLICITATIONS

In 1998, the Energy Commission successfully conducted three competitive solicitations that provided approximately $49 million in PIER funds for 83 projects in five identified subject areas. The subject

areas include renewable generation, environmentally preferred advanced generation, end-use energy efficiency, energy-related environmental research, and strategic energy research.

Of the 39 PIER-funded Transition projects, 37 have now been completed and one was cancelled as of the end of the fourth quarter of 1999. The one remaining transition project will be completed within the next year. The following is one example of a completed PIER-funded transition project.

Residential Thermal Distribution Systems

The purpose of this $400,000 PIER-funded project with California Institute for Energy Efficiency was to develop new knowledge and prototype technologies that improve the energy-efficiency and performance of heating, ventilation, and air conditioning (HVAC) equipment in residential buildings.

The work included developing and testing the effectiveness and durability of duct sealant technologies for use in residential buildings. New methods of measuring duct leakage were evaluated, and interactions between equipment sizing and the effectiveness of the distribution system to deliver cooling throughout a home were analyzed. A significant issue investigated was the ability of downsized equipment and good distribution systems to deliver the same cooling benefits as larger, typical HVAC systems, but at a lower cost to the consumer.

Outcomes from the Project:

- This investigation yielded a new duct leakage test called DeltaQ.
- The existing American Society for Testing Materials (ASTM) Standard (E1554) for measuring duct leakage has been rewritten and submitted to the ASTM standards review process.
- A draft ASTM standard for longevity testing of duct sealants was developed. A draft was submitted to the ASTM subcommittee E06.41 for balloting and comment. The comments on the draft resulted in changes to the test method and apparatus. A new test apparatus was constructed with funding from the United States Department of Energy.
- Simulations of summer temperature pull-down time have shown that duct system improvements can be combined with equipment downsizing to save cost, energy consumption, and peak power and still provide equivalent or superior comfort.
- Field-testing has shown that standard flowhoods can be poor for measuring residential register flows.
- Procedures for HVAC System Design and Installation (for Home Energy Raters) have been updated.
- Duct efficiency calculations are included in the Low-Rise Residential Alternative Calculation Method Approval Manual for 1998 Energy Efficiency Standards for Low-Rise Residential Buildings (CEC 1999).

More information on this particular project and all other PIER-funded projects will be provided in the upcoming 1999 Annual PIER Report, which will be submitted to the Legislature in the first quarter of 2000.

III. PIER COLLABORATIVE FUNDING STATUS REPORT

Electric Power Research Institute Collaborative Funding

The Energy Commission has provided $13.29 million in PIER funds for collaborative funding with the Electric Power Research Institute (EPRI), a national nonprofit research organization. This contract with EPRI provides the Energy Commission with access to 30 different research target areas through the year 2000.

This funding allows the Energy Commission to participate in guiding national RD&D activities in specified areas and will help to ensure that California continues to receive the benefits of these nationally funded electricity RD&D efforts. Through the EPRI collaborative funding, the PIER Program supports California-specific electricity—related research in several target areas.

During the fourth quarter, several PIER-funded EPRI research projects were initiated. The following is one example of a research project funded through this collaboration.

EPRI Target 26: Agriculture

This energy-related agricultural research target offers farmers a complete package of advanced energy solutions and technical support to increase farm production and reduce costs.

Currently, farms in the United States spend about $12 billion each year for energy. Of this amount, $3.8 billion goes toward electricity purchases. This research is expected to provide energy solutions for agribusiness that will improve the environment while increasing farm production and reducing costs. The following list provides the proposed outcomes of this research target.

Proposed Outcomes:

- Increase the potential for the use of ozone in place of chemicals or other methods in agriculture
- Provide experience and knowledge on innovative technologies and practices to increase production and reduce costs in agribusiness
- Increase the use of energy efficient technologies and practices in agriculture

More information on this project and all other PIER-funded EPRI projects will be provided in the upcoming 1999 Annual PIER Report.

IV. RECENT PIER FUNDING EFFORTS AND RESULTS

A. PIER Program Areas

(1) Buildings End-Use Energy Efficiency

In response to a competitive solicitation in the Buildings End-Use Energy Efficiency Program area, the Energy Commission evaluated 11 programmatic proposals during the fourth quarter of 1999. As a result of these evaluations, the following three programmatic proposals received PIER funding awards:

1) Integrated Energy Systems Productivity and Building Science Program
2) High Performance Commercial Building Systems Program
3) Energy Efficient and Affordable Small Commercial and Residential Buildings Program

Some of the proposed outcomes of these programs include:

- The reduction of energy use in existing and future California households and commercial buildings, which will also result in significant cost savings to ratepayers;
- Environmental and health benefits to commercial and residential building occupants;
- New job opportunities in the energy efficiency industry.

The proposed awards total $17.32 million and were approved at the Energy Commission s December 1, 1999, Business Meeting. Contracts will be developed during the first quarter of 2000.

A detailed description of these programs will be provided in the upcoming 1999 PIER Annual Report.

(2) Renewable Energy Technology

On November 10, 1999, the Renewable Energy Technologies program area released a $1.3 million competitive negotiation for small-scale/modular distributed biomass power projects. The Notices of Intent to Bid were due on December 17, 1999. Discussion proposals are due on January 7, 2000, and final proposals are due on February 14, 1999. The Notice of Awards will be made on February 28, 2000.

(3) Strategic Energy Research

During the fourth quarter of 1999, the Energy Commission approved funding for two major projects in the Strategic Energy Research program area. The following are descriptions of the two projects:

a) In November 1999, the Energy Commission approved a $4.5 million award to Pacific Gas & Electric (PG&E) and U.C. Berkeley s Pacific Earthquake Engineering Research Center to conduct seismic research in several critical areas. The work will be performed by researchers at several universities under the overall program oversight of PG&E and the Center.

This project will improve the scientific knowledge of earthquake risks and will develop tools to increase the ability of California s electric system to deliver critical services in the event of seismic events. It will also provide important information to emergency response personnel in the planning for and responding to earthquake emergencies.

This project is funded as a sole-source contract and is a follow-on award to a successful PIER-funded transition contract. These funds will be expended over a three-year period and will be matched with approximately $2.7 million from the California Department of Transportation and additional funding from the U.S. Geological Survey and the Federal Emergency Management Agency.

b) In December 1999, the Energy Commission approved a $7.2 million award to support a three year research program conducted by Lawrence Berkeley National Lab on behalf of the Consortia for Electric Reliability Technology Solutions. This research program will develop improved real-time system monitoring and improve control and communication technologies. In addition, improved integration of distributed resources and demand bidding will help ensure system-wide reliability as early as the summer of 2000. The program will also develop advanced approaches to bidding for ancillary services, such as spinning reserve and voltage support. This latter feature will lower ratepayer costs for maintaining system reliability.

   This project is funded as an intergovernmental agreement, and includes participation by the California Independent System Operator and the Power Exchange. The U.S. Department of Energy is contributing at least $10 million to this project.

B. PIER Energy Innovations Small Grant Program

This PIER-funded program, administered by the California State University Institute, provides a simplified funding-award process for proof of concept research projects proposed by small businesses, non-profits, academic institutions and individuals. The Energy Innovations Small Grant Program provides PIER funding support for RD&D innovations that might otherwise not be successfully pursued. The maximum amount of any individual grant award is $75,000.

Three solicitations have taken place during 1999. For the first two, the Energy Commission approved 18 projects totaling $1.35 million, with the projects starting in October 1999.

The third solicitation effort resulted in 70 additional proposals that are currently being evaluated and scored. Awards from this third solicitation will be made in early 2000.

The following is one example of a project funded through this program.

Process for Converting Sewage Sludge and Municipal Solid Wastes to Clean Fuels

The Energy Commission awarded a $75,000 grant to Environmental Energy Systems, Inc., to research the feasibility of producing hydrogen and other clean fuels from wet biomass, sewage sludge and municipal solid wastes.

Proposed Outcomes:

- Quantify and analyze the liquids, gases and solid residues produced from a bench-scale prototype using the output of an aerobic digester as the feedstock.
- Quantify the fuel values and requirements for additional cleaning/treatment of the resulting fuels for use in gas turbines for electric generation.
- Assess the mass and energy balance, system optimization and economic feasibility.

Anticipated Benefits:

- Achieve 40 percent thermal efficiency in processing wet biomass sludge into electric power.
- Reduce quantity of secondary waste requiring landfill disposal. A typical sewage treatment plant, such as the plant in Encina, California, produces 90-100 metric tons per day of secondary waste and pays $24 per wet ton for landfill disposal.
- Reduce the need for landfill leachate collection and treatment and landfill gas recovery.

More information on this project and all other PIER-funded Small Grants projects will be provided in the upcoming 1999 Annual PIER Report.

V. OTHER PIER PROGRAM ACTIVITIES

Information Transfer/Reporting Activities

A major PIER-sponsored technology forum entitled Energy Innovations 99: Sharing the Benefits of California s Research Investment took place on October 25-27, 1999, in San Diego, California. The conference met its goal, which was to bring together energy researchers, investors, and consumers to explore new opportunities for bringing PIER-funded energy innovations to the marketplace. Attendees also explored how to coordinate the PIER Program with other public interest energy programs around the country. Approximately 300 people from throughout the State and the nation attended this conference, which proved to be a highly successful forum for information exchange and will contribute to further energy innovations and benefits.

VI. CONCLUSION

The Energy Commission remains fully committed to administering the PIER Program in an efficient and effective manner that ensures public input and accountability. The PIER section of the Energy Commission s Web Site is a means of communicating with stakeholders and the public. The Web Site can be accessed at:

www.energy.ca.gov/research/PIER

The Energy Commission continues to successfully develop and implement the PIER Program, in accordance with the directives contained in AB 1890 and SB 90. Should you have questions or comments, please feel free to contact Tim Schmelzer, Director of Governmental Affairs, at 654-4942.